

## PATENT COOPERATION TREATY

## PCT

REC'D 02 OCT 2001

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

WIPO

PCT

(PCT Article 36 and Rule 70)

|  |   |   |  |
|--|---|---|--|
| Applicant's or agent's file reference<br>215/955-PCT   |   | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |  |
| International application No.<br>PCT/US00/03107  | International filing date (day/month/year)<br>04 February 2000 (04.02.2000) | Priority date (day/month/year)<br>27 May 1999 (27.05.1999)  |  |
| International Patent Classification (IPC) or national classification and IPC<br>IPC(7): B01D 63/00 and US Cl.: 210/321.71,321.72   |   |   |  |
| Applicant<br>NATE INTERNATIONAL  |   |   |  |
| <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>2</u> sheets.</p>  |   |   |  |
| <p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p> |   |   |  |
| Date of submission of the demand<br>03 November 2000 (03.11.2000)  |   | Date of completion of this report<br>16 August 2001 (16.08.2001)  |  |
| Name and mailing address of the IPEA/US<br>Commissioner of Patents and Trademarks<br>Box PCT<br>Washington, D.C. 20231<br>Facsimile No. (703)305-3230  |   | Authorized officer<br>Richard W. Ward<br>DEBORAH THOMAS<br>PARALEGAL SPECIALIST<br>Telephone No. (703) 308-0661               |  |

Form PCT/IPEA/409 (cover sheet)(July 1998)

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/03107

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☐ the international application as originally filed.
- ☒ the description:  
pages 1-12 as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the claims:  
pages NONE, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
pages 13-14, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the drawings:  
pages 1-7, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☐ the sequence listing part of the description:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

**WRITTEN OPINION**

International application No.  
PCT/US00/03107

**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. STATEMENT**

|                               |                               |     |
|-------------------------------|-------------------------------|-----|
| Novelty (N)                   | Claims <u>11, 13</u>          | YES |
|                               | Claims <u>1-10, 12, 14-17</u> | NO  |
| Inventive Step (IS)           | Claims <u>NONE</u>            | YES |
|                               | Claims <u>1-17</u>            | NO  |
| Industrial Applicability (IA) | Claims <u>1-17</u>            | YES |
|                               | Claims <u>NONE</u>            | NO  |

**2. CITATIONS AND EXPLANATIONS**

Claims 1-10, 12, and 14-17 lack novelty under PCT Article 33(2) as being anticipated by CALL (US 4,083,780). As to claims 1 and 17, CALL [780] discloses a filtration system comprising: an outer casing 36 defining an outer lumen and a plurality of inner casings 26 having an inner lumen and containing a filter therein, wherein in the instance that a brine seal 28 is omitted (column 4, lines 58-62), a fluid flow path is created in which a feed stream exiting from an upstream filter (e.g., filter 14a) enters a downstream filter and is diluted by additional feed fluid which flows through an orifice (i.e., the small space between 26 and elements 10, see column 4, lines 43-45). CALL [780] also discloses: flowing through an opening of inner casing 26 which appears to be designed to produce a pressure drop of less than 20%, as recited in instant claims 2-3; a plurality of filters within each inner casing 26, as recited in instant claim 4; a continuous core space 12 for conducting permeate, as recited in instant claims 5 and 8; manifolds extending from a single side (see figure 1), as recited in instant claims 6-7; an annular space between 10 and 26, as recited in instant claim 9; and spiral wound elements (see figure 2), as recited in instant claim 10. Concerning claim 12, CALL [780] discloses embodiments usable above/at ground level - see column 1, lines 5-42. Regarding claims 14-16, CALL [780] discloses coupling/filter ratios less than or equal to 1:4 (exemplary figures 1 and 3 demonstrate a ratio of 9:28 when only 4 membranes are used per inner lumen, six membranes per inner lumen result in a 9:42 ratio, and is suggested by the use of a "plurality of elements" - see, e.g., claim 1). Applicant's arguments critical of CALL [780] are not convincing, as they rely upon the unsupported assumption that there is no pressure drop within the orifice of CALL [780]. The space between the elements 26 and 10 is disclosed as "small"; thus, it can be reasonably concluded that some pressure drop would occur owing to frictional interactions, and no additional "restrictor valve" would be needed.

Claim 11 lacks an inventive step under PCT Article 33(3) as being obvious over CALL [780] in view of ECKMAN (US 5,470,469). CALL [780] is expanded above with respect to depended upon claim 1 above. Claim 11 recites the additional limitation of hollow fiber modules. CALL [780] suggests the use of "any separation element" (column 4, lines 36-37). ECKMAN [469] teaches the replacement of spiral wound elements with hollow fiber elements (column 4, lines 5-24), said hollow fiber elements also using an orifice (48a) for dilution purposes. It would have been well within the skill of the routineer at the time the invention was made to utilize the hollow fiber elements in place of the spiral wound elements of CALL [780] for the purpose of overcoming disadvantages associated with the use of spiral wound elements (see columns 1-2 of '469). Applicant confusingly argues that CALL [780] does not supply feed fluid bypass for dilution purposes, yet states that the bypass is used for preventing excessive pressure differentials. It is submitted that any bypassed fluid would necessarily result in dilution.

Claim 13 lacks an inventive step under PCT Article 33(3) as being obvious over CALL [780] in view of WO 98/23361 (hereafter, WIPO). CALL [780] is expanded above with respect to depended upon claim 1 above. Claim 13 recites the additional limitation of an energy recovery device. WIPO teaches the use of an energy recovery device 101 in combination with a similar membrane separation system. It would have been well within the skill of the routineer at the time the invention was made to utilize the energy recovery device of WIPO in combination with the system of CALL [780] for the purpose of economic optimization of a particular membrane separation process. Applicant argues that WIPO does not represent analogous art; however, such arguments are unconvincing, as the systems are used for a similar use (i.e., the purification of solutions), and correspondingly, the desirability of optimizing power consumption as taught by WIPO would apply to both disclosed systems.

Claims 1-17 meet the criteria set out in PCT Article 33(4), because the invention may be used in the separations industry.

----- NEW CITATIONS -----

# PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

**PCT**

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner  
US Department of Commerce  
United States Patent and Trademark  
Office, PCT  
2011 South Clark Place Room  
CP2/5C24  
Arlington, VA 22202  
ETATS-UNIS D'AMERIQUE  
in its capacity as elected Office

|  |   |
|--|---|
| <b>Date of mailing (day/month/year)</b><br>16 February 2001 (16.02.01)           |   |
| <b>International application No.</b><br>PCT/US00/03107                           | <b>Applicant's or agent's file reference</b><br>215/955-PCT     |
| <b>International filing date (day/month/year)</b><br>04 February 2000 (04.02.00) | <b>Priority date (day/month/year)</b><br>27 May 1999 (27.05.99) |
| <b>Applicant</b><br>CHANCELLOR, Dennis et al                                     |   |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
03 November 2000 (03.11.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

|  |  |
|--|--|
| <b>The International Bureau of WIPO</b><br>34, chemin des Colombettes<br>1211 Geneva 20, Switzerland<br>Facsimile No.: (41-22) 740.14.35 | <b>Authorized officer</b><br>A. Karkachi<br>Telephone No.: (41-22) 338.83.38 |
|--|--|

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/03107

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B01D 63/00  
US CL : 210/321.71, 321.72

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Continuation Sheet

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X          | US 4,083,780 A (CALL) 11 April 1978, see figure 1 and column 4, lines 60-61.       | 1-10, 13-16           |
| Y          | US 5,470,469 A (ECKMAN) 28 November 1995, see figure 2, reference number 48a.      | 1, 4-16               |
| Y          | WO 98/23361 A1 (KEEFER) 04 June 1998, see abstract and figure 4.                   | 1, 4-16               |
| A          | WO 98/09718 A1 (NATE INTERNATIONAL) 12 March 1998, see page 12, lines 6-8.         | 1-16                  |
| A          | US 4,064,052 A (ZIMMERLY) 20 December 1977, see figures 1-4.                       | 1-16                  |

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

|   |  |  |
|---|--|--|
| <p>* Special categories of cited documents:</p>   |  |  |
| "A" document defining the general state of the art which is not considered to be of particular relevance  | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  |  |
| "E" earlier application or patent published on or after the international filing date   | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone   |  |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |  |
| "O" document referring to an oral disclosure, use, exhibition or other means  |  |  |
| "P" document published prior to the international filing date but later than the priority date claimed  | "&" document member of the same patent family  |  |

Date of the actual completion of the international search

30 May 2000 (30.05.2000)

Date of mailing of the international search report

13 JUN 2000

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

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Authorized officer

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